I claim:

1. A system comprising:

a lithium battery having an internal resistance;

a charge storage capacitor electrically connected to said lithium battery;

a first device electrically connected to said lithium battery and adapted to be powered by said battery; and

at least one second device electrically connected to said charge storage capacitor,

wherein the at least one second device is adapted to:

access a predetermined set of charge time measurement set-up parameters and a predetermined elective replacement time (ERT) charge time limit determined from a battery resistance ERT target that corresponds to a battery charge depletion target;

determine a rate of charge storage in the capacitor using the predetermined set of charge time measurement set-up parameters;

compare the determined rate of charge storage in the capacitor to the predetermined ERT charge time limit for the predetermined set of charge time measurement set-up parameters; and

declare an ERT based on a number of comparisons between the determined rate of charge storage in the capacitor and the ERT charge time limit.

2. The system of claim 1, wherein the rate of charge storage is correlated to a value of internal battery resistance through a charge depletion vs. battery resistance mathematical model.

3. The system of claim 1, wherein the first device has a plurality of relatively quiescent periods and the storage capacitor is adapted to provide a basis of determining the rate of charge storage during one of the relatively quiescent periods.

4. The system of claim 1, wherein the predetermined set of charge time measurement set-up parameters include:

a physician-programmed final voltage (VF) to end a time measurement for determining the rate of charge storage in the capacitor; and

an initial reference voltage (VI) to begin the time measurement for determining the rate of charge storage in the capacitor,

wherein a pacing supply storage voltage (Vcs) increases approximately linearly from VI to VF during the time measurement for determining the rate of charge storage in the capacitor.

5. The system of claim 4, wherein:

the at least one second device includes a multiplexer for selecting one of VF and VI to be compared to a capacitor voltage level (Vsc) for controlling current flow from the battery power terminal to the capacitor; and

the at least one second device selects VI to be compared to Vsc to begin a time charge measurement count and VF to be compared to Vsc to end the time charge measurement count.

6. The system of claim 1, wherein the at least one second device is adapted to declare an ERT if N previous measurements are greater than the ERT charge time limit.

7. The system of claim 1, wherein a device operating current rage is subdivided into current range bins, each bin having a battery charge depletion target and a battery resistance ERT target, each bin further having a predetermined set of charge time measurement set-up parameters and a predetermined ERT charge time limit determined from the battery charge depletion target and the battery resistance ERT target.

8. The system of claim 1, wherein the rate of charge storage is correlated to a value of internal battery resistance through a charge depletion vs. battery resistance mathematical model.

9. The system of claim 1, wherein the at least one second device includes a time charge counter for measuring a time in which a relatively constant current charges the capacitor from an initial reference voltage (VI) to a physician-programmed final voltage (VF).

10. A pacemaker, including:

a battery power terminal for a pacemaker battery;

sensing and pacing control circuitry electrically connected to the battery power terminal;

a pacing supply storage (PSS) capacitor electrically connected to the battery power terminal and to a discharge switch;

comparison circuitry, including:

a first comparator electrically connected to the battery power terminal and adapted for comparing a battery terminal voltage (Vbatt) to a brownout voltage (Vstop), the first comparator having a first comparator output;

a second comparator electrically connected to the PSS capacitor and adapted for comparing a pacing supply storage voltage (Vcs) to at least one reference voltage (Vx), the second comparator having a second comparator output, wherein the first comparator output and the second comparator output are adapted to control current flow from the battery power terminal to the PSS capacitor; and

charge time measurement (CTM) control circuitry electrically connected to the sensing and pacing control circuitry, the comparator circuitry and the discharge switch, the charge time measurement control circuitry being adapted to:

access a predetermined set of charge time measurement set-up parameters and a predetermined elective replacement time (ERT) charge time limit determined from a battery resistance ERT target that corresponds to a charge depletion target;

determine a rate of charge storage in the PSS capacitor using the predetermined set of charge time measurement set-up parameters;

compare the determined rate of charge storage in the PSS capacitor to the predetermined ERT charge time limit for the predetermined set of charge time measurement set-up parameters; and

declare an ERT based on a number of comparisons between the determined rate of charge storage in the charge storage capacitor and the ERT charge time limit.

11. The pacemaker of claim 10, further comprising a switched capacitor power supply operably connected to the battery power terminal and the PSS capacitor for charging the PSS capacitor, wherein an output of the comparison circuit is electrically connected to the switched capacitor power supply to control current flow from the battery power terminal to the pacing supply storage capacitor.

12. The pacemaker of claim 11, wherein the predetermined set of charge time measurement set-up parameters include:

a physician-programmed final voltage (VF) to end a time measurement for determining the rate of charge storage in the PSS capacitor; and

an initial reference voltage (VI) to begin the time measurement for determining the rate of charge storage in the PSS capacitor.

13. The pacemaker of claim 12, wherein a pacing supply storage voltage (Vcs) increases approximately linearly from VI to VF during the time measurement for determining the rate of charge storage in the PSS capacitor.

14. The pacemaker of claim 12, wherein:

the CTM control circuitry includes a multiplexer for selecting one of VF and VI to be compared to a PSS capacitor voltage level (Vsc) within the pacemaker control circuitry for controlling current flow from the battery power terminal to the PSS capacitor; and

the CTM control circuitry selects VI to be compared to Vsc to begin a time charge measurement count and VF to be compared to Vsc to end the time charge measurement count.

15. The pacemaker of claim 12, wherein the CTM control circuitry includes a time charge counter for measuring a time in which a relatively constant current charges the PSS capacitor from VI to VF.

16. The pacemaker of claim 12, wherein the pacemaker control circuitry includes a sensing and pacing control block adapted for selecting a voltage level (Vd) to which the PSS capacitor is discharged prior to beginning the time measurement for determining the rate of charge storage in the PSS capacitor.

17. The pacemaker of claim 16, wherein the CTM control circuitry includes a multiplexer for selecting one of the VF, VI and Vd to be compared to a PSS capacitor voltage level (Vsc) within the pacemaker control circuitry for controlling current flow from the battery power terminal to the PSS capacitor.

18. The pacemaker of claim 17, wherein the CTM control circuitry selects:

VF to be compared to Vsc to synchronize the beginning of the time measurement to the completion of a cardiac depolorization;

Vd to be compared to Vsc to limit the discharge of the PSS capacitor and open a PSS capacitor discharge switch;

VI to be compared to Vsc to begin a time charge measurement count after a bypass capacitor (Cb) is discharged and a battery terminal voltage (Vbatt) is driven to a brownout voltage (Vstop) limit; and

VF to be compared to Vsc to end the time charge measurement count.

19. A system, comprising:

a pacing storage capacitor;

a battery power terminal for a battery, the terminal being electrically connected to the pacing storage capacitor to charge the pacing storage capacitor;

a discharge switch electrically connected to the pacing storage capacitor; and

control circuitry electrically connected to the discharge switch to selectively discharge the storage capacitor and electrically connected to the pacing storage capacitor to detect a voltage across the pacing storage capacitor, the control circuitry to perform a time measurement for determining a rate of charge storage in the pacing storage capacitor, wherein the control circuitry is adapted to:

discharge the pacing storage capacitor to a predetermined voltage level (Vd) prior to beginning the time measurement;

detect when the voltage across the pacing storage capacitor reaches a predetermined initial voltage level (VI) to begin the time measurement; and

detect when the voltage across the pacing storage capacitor reaches a predetermined final voltage (VF) to end the time measurement.

20. The system of claim 19, wherein the system is incorporated in a pacemaker.

21. The system of claim 19, wherein the control circuitry is further adapted to access a predetermined elective replacement time (ERT) charge time limit, and to declare an ERT based on a number of comparisons between the rate of charge storage in the pacing storage capacitor and the ERT charge time limit.

22. The system of claim 19, further comprising circuitry to control current flow from the battery power terminal to charge the pacing storage capacitor.

23. The system of claim 22, wherein the circuitry to control current flow includes a switched capacitor power supply and comparison circuitry, the comparison circuitry includes:

a first comparator electrically connected to the battery power terminal and adapted for comparing a battery terminal voltage (Vbatt) to a brownout voltage (Vstop), the first comparator having a first comparator output; and

a second comparator electrically connected to the pacing storage capacitor and adapted for comparing a pacing supply storage voltage (Vcs) to at least one reference voltage (Vx), the second comparator having a second comparator output,

wherein the first comparator output and the second comparator output are used to control to control the switched capacitor power supply to control current flow from the battery power terminal to the pacing storage capacitor.

24. The system of claim 19, further comprising a number of registers to hold a Vd value, a VI value, and a VF value, and a multiplexer for selecting one of VF, VI and Vd to be compared to the voltage across the pacing storage capacitor.

25. The system of claim 19, wherein the rate of charge storage is determined when the voltage across the pacing storage capacitor increases linearly from VI to VF.